AMENDMENTS TO THE CLAIMS

LISTING OF CLAIMS:

1. (Previously presented) A method comprising:

a) obtaining a plurality of coded probes, each of the coded probes comprising a probe molecule attached to at least one nano-barcode, and at least two of the coded probes comprise two or more identifiably different nano-barcodes that can generate different detectable signals, wherein the nano-barcode is selected from the group consisting of carbon nanotubes, fullerenes, submicrometer metallic barcodes, nanoparticles, quantum dots, combinations thereof, and the nano-barcode made from nano-tag elements;

b) contacting one or more target molecules with the coded probes, wherein the coded probes comprise oligonucleotides and bind to different locations on the target molecules;

c) ligating the coded probes that are adjacent one another on the target molecules to form ligated coded probes and aligning the ligated coded probes on a substrate surface by molecular combing using microfluidic channels and forming organized coded probes, wherein the ligated coded probes are aligned in the direction of the microfluidic flow in the microfluidic channels;

d) identifying the organized coded probes; and

e) detecting the one or more target molecules based on the organized coded probes.

2. (Canceled)

3. (Currently amended) The method of claim 1, wherein the target molecule is a nucleic acid.

4. (Previously Presented) The method of claim 3, further comprising contacting a library of coded probes comprising all possible sequences for a particular length of oligonucleotide with the one or more target molecules.

5. (Canceled)

6. (Original) The method of claim 3, wherein the nucleic acid is attached to a surface.

7. (Canceled)

8. (Previously Presented) The method of claim 3, further comprising separating the ligated coded probes from the nucleic acid and non-ligated coded probes.

9. (Canceled)

10. (Previously Presented) The method of claim 1, wherein the organized coded probes are identified by scanning probe microscopy.

11. (Previously Presented) The method of claim 1, wherein the organized coded probes are identified by an equipment selected from the group consisting of atomic force microscopy, scanning tunneling microscopy, lateral force microscopy, chemical force microscopy, force modulation imaging microscopy, magnetic force microscopy, high frequency magnetic force microscopy, magnetoresistive sensitivity mapping microscopy, electric force microscopy, scanning capacitance microscopy, scanning spreading resistance microscopy, tunneling atomic force microscopy and conductive atomic force microscopy.

12. (Previously Presented) The method of claim 1, wherein the organized coded probes aligned on the substrate surface are identified by scanning probe microscopy.

13. (Previously Presented) The method of claim 3, further comprising determining the sequences of the oligonucleotides that hybridize to the nucleic acid.

14. (Previously Presented) The method of claim 13, further comprising determining the sequence of the nucleic acid based on the sequences of oligonucleotides that hybridize to the nucleic acid.

15. (Previously Presented) The method of claim 3, further comprising identifying the nucleic acid based on the coded probes that hybridize to the nucleic acid.

16. (Previously Presented) The method of claim 1, wherein the target molecule is a protein, a peptide, a glycoprotein, a lipoprotein, a nucleic acid, a polynucleotide, or an oligonucleotide.

17. (Previously Presented) The method of claim 16, wherein two or more target molecules are present in a sample and the target molecules in the sample are analyzed at the same time.

18. (Previously Presented) The method of claim 16, wherein two or more target molecules are present in a sample and the target molecules of the same type are analyzed at the same time.

19. (Previously presented) A method comprising:

a) obtaining a plurality of coded probes, each of the coded probes comprising a probe molecule attached to at least one nano-barcode, and at least two of the coded probes comprise two or more identifiably different nano-barcodes that can generate different detectable signals, wherein the nano-barcode is selected from the group consisting of carbon nanotubes, fullerenes, submicrometer metallic barcodes, nanoparticles, quantum dots, combinations thereof, and the nano-barcode made from nano-tag elements;

b) contacting one or more target molecules with the coded probes, wherein one or more of the coded probes bind to different locations on the target molecules and the coded probes comprise oligonucleotides;

c) ligating the coded probes that are adjacent one another on the target molecules to form ligated coded probes and aligning the ligated coded probes on a substrate surface by molecular

combing using microfluidic channels and forming aligned coded probes, wherein the ligated coded probes are aligned in the direction of microfluidic flow in the microfluidic channels;

d) identifying the aligned coded probes using scanning probe microscopy ; and

e) detecting the one or more target molecules based on the aligned coded probes.

20. (Canceled)

21. (Previously Presented) The method of claim 19, wherein the scanning probe microscopy is selected from the group consisting of atomic force microscopy, scanning tunneling microscopy, lateral force microscopy, chemical force microscopy, magnetic force microscopy, high frequency magnetic force microscopy, electric force microscopy, scanning capacitance microscopy, scanning spreading resistance microscopy, tunneling atomic force microscopy and conductive atomic force microscopy.

22. (Original) The method of claim 19, wherein the target molecule is a nucleic acid.

23. (Previously Presented) The method of claim 22, further comprising determining at least part of the sequence of the nucleic acid based on the aligned coded probes.

24. (Previously Presented) The method of claim 19, further comprising separating the bound coded probes from the target molecules after the coded probes are aligned on a surface.

25 – 28. (Canceled)

29. (Previously Presented) The method of claim 1, wherein the coded probes are further aligned on the substrate surface by free flow electrophoresis.

30. (Previously Presented) The method of claim 19, wherein the coded probes are further aligned on the substrate surface by free flow electrophoresis.

31. (Previously presented) A method comprising:

a) obtaining a plurality of coded probes, each of the coded probes comprising a probe molecule attached to at least one nano-barcode, and at least two of the coded probes comprise two or more identifiably different nano-barcodes that can generate different detectable signals, wherein the nano-barcode is selected from the group consisting of carbon nanotubes, fullerenes, submicrometer metallic barcodes, nanoparticles, quantum dots, combinations thereof, and the nano-barcode made from nano-tag elements;

b) contacting one or more target molecules with the coded probes and forming binding complexes, wherein the coded probes comprise oligonucleotides;

c) aligning the coded of the binding complexes on a surface by free flow electrophoresis and forming organized coded probes;

d) identifying the organized coded probes; and

e) detecting the one or more target molecules based on the organized coded probes.

32. (Previously presented) A method comprising:

a) obtaining a plurality of coded probes, each of the coded probes comprising a probe molecule attached to at least one nano-barcode, and at least two of the coded probes comprise two or more identifiably different nano-barcodes that can generate different detectable signals, wherein the nano-barcode is selected from the group consisting of carbon nanotubes, fullerenes, submicrometer metallic barcodes, nanoparticles, quantum dots, combinations thereof, and the nano-barcode made from nano-tag elements;

b) contacting one or more target molecules with the coded probes, wherein one or more coded probes bind to the target molecules and forming binding complexes, wherein the coded probes comprise oligonucleotides;

c) aligning the coded probes of the binding complexes on a surface by free flow electrophoresis and forming aligned coded probes;

d) identifying the aligned coded probes using scanning probe microscopy; and

e) detecting the one or more target molecules based on the aligned coded probes.